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ABSTRACT

Questions related to the expansion of online bibliographic searching at the University of Wisconsin-Stout are examined. A brief review of the literature on why libraries search online is followed by a discussion of the specific situation at Stout where the ERIC data base is the only online service currently used. The variety of online data bases leads to a comparative analysis of data base subject coverage. Rates charged by the major vendors--Lockheed, SDC, and BRS--for online searching, based on online connect time, off-line printing, telecommunications, rates for data bases searched (including discount), training personnel, search aids, hardware, and publicity, are analyzed. Software features offered by these vendors are reviewed, with a discussion of desirable system features, e.g., online aids, and output formats. An evaluation of vendor services is included, as well as an examination of search services using the resources of other libraries. The implications of online searching in terms of staffing, effect on interlibrary loan, and the question of charging patrons for the service are also considered. (MBR)

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Alternatives and Implications for On-Line Searching: A Working Paper

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March 22, 1978

Media Retrieval Services--Pierce Library
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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

IR005965

PREFACE

As "other data bases" librarian, it is my responsibility to keep up with develpoments in data base searching. With the introduction of NYTIB and the experimentation with the Canadian tourism data base, M.R.S.-- Pierce Library seems to be closer to expanded use of on-line bibliographic searching.

I have prepared this report to help us see what our alternatives are and what the implications may be for an on-line search service.

My objective was not to make recommendations but to raise questions and clarify alternatives. I intended this report to be used as a study document for making informed decisions about on-line searching.

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I. INTRODUCTION

Why on-line searching?

Librarians are not very specific about why they institute on-line bibliographic search services. DeGennaro (1973) says without explanation that "libraries will play a key role in providing access to information in machine-readable data bases on their campuses. . . . libraries will be responsible for assisting users in gaining access to information in this new form." Public librarians in the DIALIB project cited increased awareness of information among their patrons, new users of interlibrary loan, and a better image for the library as impacts of their on-line searching. (Mick, 1975) Innumerable articles in Special Libraries compare the time and money spent in on-line and manual searching. Martin (1978) notes that she uses on-line searching to fill in gaps in her printed indexes and to verify requests for interlibrary loan.

But why do libraries search on-line? One must assume that libraries use on-line bibliographic data bases as extensions of their own indexes and abstracts to provide users with access to information. That statement, however, raises many questions when the specifics of instituting the service are addressed:

which data bases?
which users?
at what cost and to whom?
for what purposes?
access, or documents?

This report attempts to address these and related questions, in order to help us at UW-Stout make good decisions about the future of on-line search services. We need to examine our alternatives and the implications of decisions we make because on-line searching could consume staffing and financial resources that

we may or may not want to commit to it. As Wax (1976) notes,

> the introduction of computerized search services . . . represents a significant extension of the traditional reference function, an extension that will have potential impact on all public services of the library, including circulation and interlibrary loan. For that reason, the organization of the new search service must be well planned so as to have the greatest benefit to the user without diminishing the quality of the more traditional public services.

Why here?

One question that arises very early is why does Stout need on-line searching? Right now, we use ERIC mainly as a time-saver: searching on-line allows pre-coordination of the search ideas, as opposed to requiring the user to sift through all the citations found under each idea. Our users often comment about the time the search has saved for them. Users at the University of Georgia noted that with computer searches "they are able to locate articles quicker and with less effort and are less likely to get sidetracked or discouraged." (Carmon, 1973) Searching indexes for relevant material can often be very time-consuming. At Stout, we have often seen patrons come into the reference office in desperation after spending 20 minutes or more looking at indexes and not finding much. As Griffith (1976) notes, the time spent in locating and identifying material is often out of proportion to the time spent using it. In fact, one function of reserve readings is to allow students "equal access" to information instead of relying on the students' varying skills and persistence in retrieving information. (Griffith, 1976)

On the other hand, learning how to evaluate information that one finds can be an important part of the process of education. To many instructors, one of the objectives of writing a research paper is to practice finding information. "Finding an article that supports one's ideas--or contradicts them, learning of a promising new technique, delving into the origins of a problem can all

generate intellectual excitement that should be part of every student's experience." (Griffith, 1976) One instructor at Stout has noted the serendipitous nature of manual searching: seeing "irrelevant" citations often gives the students new ideas. Also, the question of saving time may be less of an issue with students than it is in the manual vs. on-line studies reported in Special Libraries. In most of those studies, an organization is trading researchers' or librarians' time for the money spent in accessing on-line data bases. In most cases, the on-line search costs less than the personnel costs involved in a manual search. Students, however, are not being paid for their time: the cost trade-off is much more abstract. As noted above, the experience of manual searching may be an important part of their educational experience, in which case the time-cost is less important.

This is the tension that academic libraries live within: whether they are nurturing or short-circuiting the learning process with their services. On-line searching may bypass the students' direct contact with indexes, and so with the diversity of information that exists. But it also may smooth the way to the students' actual contact with the specific information they seek.

Which data bases here?

Wax (1976) summarizes the decisions to be made at this point:

> The first decision related to the initiation of computer search services is the delineation of the departments and disciplines that are to be served. In colleges and universities, there is potential demand for most of the 30+ presently accessible data bases as well as for many not yet commercially available. Ultimately the library administration may wish to serve as many departments and disciplines as possible, but there are advantages to initiating service with a smaller number of data bases covering a few broad areas.
>
> The decision to initiate services in a particular discipline should be based not merely on the presence of that discipline in the institution's curriculum but also on some perception that the faculty and students in that discipline are willing and able to

> utilize and underwrite the costs of providing the service. These factors are frequently correlated with the existence of research activity and funding in the relevant department or discipline. The specific criteria and means by which to choose those disciplines to be served initially will vary from institution to institution, but it is recommended that the decision be made by the library administration in conjunction with other administrative officers of the university, including appropriate deans, the director of research and perhaps certain department chairmen.

(The factor of funding and costs mentioned by Wax relates to the question of charging users for on-line searching. That question will be examined in Part III.)

One reason ERIC may work as well as it does at Stout is that the subject coverage in ERIC matches Stout's curriculum almost exactly. About the only major topic that is not represented is food science. Beyond ERIC, it is difficult to determine which data bases would be used here. As Wax notes, we need to ask faculty members what kind of research they are asking their students to do, what subject areas the students get involved in, and to what depth. We may discover that, for many of the programs on campus, the data bases available contain material too technical for the students. On the other hand, we may discover subject fields where the faculty haven't encouraged library use because they didn't know what was available.

One other factor can be considered: who uses data base services. Surprisingly, Stout follows the pattern of other institutions with only 15% of our searches done for undergraduates. It is reasonable to expect that any new search services we institute would also be used mostly by graduate students and faculty. Of course, graduate students and faculty are more involved in research than undergraduates, but we may want to balance the cost of a new service with the number of our patrons that it will serve.

Looking only at subject content, the following data bases seem likely candidates for expanded service at Stout:

probably useful

AGRICOLA -- formerly CAIN; corresponds to the National Agricultural Library's Bibliography of Agriculture (not owned at Stout); includes food science, nutrition, general home economics

AIM/ARM -- corresponds to Abstracts of Instructional and Research Materials in Vocational and Technical Education; heavily-used indexing tool at Stout; presently accessed through MACC in Madison; full fiche collection owned

ASI -- corresponds to American Statistics Index (owned at Stout); fiche collection owned since 1976; primary source for statistical information published by the federal government; fairly heavily used at Stout

CAB Abstracts -- corresponds to agricultural and biological indexes published by the Commonwealth Agricultural Bureaus (British), including Nutrition Abstracts, Dairy Science Abstracts (owned at Stout)

Cambridge Scientific Abstracts -- corresponds to scientific and technical indexes published by CSA, including Safety Science Abstracts (owned at Stout)

ERIC -- corresponds to Resources in Education and Current Index to Journals in Education; important indexing tools at Stout; presently accessed through MACC in Madison; full fiche collection owned

FSTA -- corresponds to Food Science and Technology Abstracts (owned at Stout)

MEDLARS -- corresponds to Index Medicus (owned at Stout) and other medical indexes; presently accessed through UW-Madison medical library (infrequently)

NICEM -- corresponds to indexes published by NICEM covering non-print education materials (owned at Stout)

NTIS -- roughly corresponds to Government Reports Announcements and Index (owned at Stout); indexes government-sponsored research in all areas of science and technology

Psychological Abstracts -- corresponds to the printed index (owned at Stout); presently accessed through UW-Madison Memorial Library (infrequently)

SAE Abstracts -- corresponds to the index to the Society of Automotive Engineers' Transactions; index and microfiche owned at Stout

possibly useful

ABI/INFORM -- indexes business management journals; title coverage similar (though more comprehensive) to NYTIB but without the newspapers and with a more specific subject orientation

BIOSIS Previews -- corresponds to Biological Abstracts and Bioresearch Index (Stout owns Biological Abstracts to 1975); covers all aspects of the life sciences

CIS -- corresponds to CIS/Index (owned at Stout); indexes Congressional publications; fiche of the documents available through UW-Parkside

COMPENDEX -- corresponds to Engineering Index (owned at Stout); covers engineering and technical literature

Exceptional Child Education Abstracts -- corresponds to the printed index (owned at Stout); covers literature on the education of handicapped and gifted children

ISMEC -- corresponds to ISMEC Bulletin, formerly Information Service in Mechanical Engineering (not owned at Stout); includes topics in energy and power systems

LISA -- corresponds to Library and Information Science Abstracts (not owned at Stout)

SOCIAL SCISEARCH -- corresponds to Social Science Citation Index (not owned at Stout); provides access to where articles are cited

Sociological Abstracts -- corresponds to the printed index (owned at Stout)

TITUS -- international index to textile information; topics include fibers, analysis, properties, etc.; prepared by the Institut Textile de France

Several other indexes that we own in printed version are also available on-line:

Art Bibliographies Modern
Chemical Abstracts
Comprehensive Dissertation Abstracts
Foundation Directory
Foundation Grants Directory
F & S Index
Metals Abstracts
PAIS
Science Abstracts, Series A: Physics

The data bases listed above are available through one or more of the major vendors. (Complete lists of data bases available from the vendors may be found in Appendices A, B, and C.) At Stout we have also been experimenting with NYTIB (New York Times Information Bank) and the Canadian Office of

Tourism's file. Other data bases available from other agencies could be useful at Stout. Williams and Rouse (1976) could be used to identify additional data bases.

ERIC was a very good choice for beginning data base services. Where we go from ERIC, and whether or not we want to go further, must depend on an actual assessment of the need that exists for on-line searching, balanced with its cost in terms of dollars, staff, and other factors.

II. ALTERNATIVE SOURCES

Data base services are available through many different agencies. The most common sources for libraries are the three major vendors of on-line services: Lockheed Information Systems, Systems Development Corporation (SDC), and Bibliographic Retrieval Services (BRS). The vendors offer a larger number of data bases at a lower cost than would be possible if libraries leased tapes and developed software individually. This section of the report will examine the three vendors in terms of pricing, software, and service. The information presented was drawn from brochures from the vendors (see Appendices A, B, and C), conversations with their representatives, and conversations with librarians using their services.

Major vendors -- Pricing

Charges for on-line searching are generally made up of three factors: on-line connect time, off-line printing, and communications network connect time. On-line connect time and off-line printing charges are usually established for each data base. For example, ERIC is available through Lockheed

at $25 per hour connect time, plus 10¢ per citation printed off-line. In general, Lockheed's on-line charges are lower than SDC's for the same data bases. BRS's pricing structure will be examined in more detail later. Both Lockheed and SDC charge per citation for off-line printouts. BRS charges a flat 15¢ per page for off-line printouts for all data bases except MEDLARS (10¢ per page), plus 50¢ mailing charge for each package of off-line output.

Communications network connect time, the third component of vendor charges, reflects a cost-saving service available to data base users. Two communications networks, TELENET and TYMNET, allow users to reduce the cost of long-distance telephone calls to the vendors' computers. The user dials a node city, which is often a local call, and the network handles the call from that point. (At Stout we have used TELENET to access NYTIB, dialling TELENET's nodes in Milwaukee or Minneapolis.) Communications network charges vary with each vendor:

Lockheed	TELENET	$5/hour
	TYMNET	$8/hour
SDC	TELENET	$8/hour
	TYMNET	$8/hour
BRS	TELENET	$4/hour for Milwaukee and Minneapolis nodes

The user is still responsible for the telephone charges to the node. For us, DAIN-line charges are about $8/hour to Milwaukee and $11/hour to Minneapolis. Price comparisons are rather surprising:

Lockheed		
DAIN-line direct	$15/hour	(charge to Los Angeles)
DAIN to Milwaukee TELENET	13	
DAIN to Minneapolis TELENET	16	
SDC		
DAIN-line direct	$15/hour	(charge to Los Angeles)
DAIN to Milwaukee TELENET	16	
DAIN to Minneapolis TELENET	19	
BRS		
DAIN-line direct	$15	(charge to New York)
DAIN to Milwaukee TELENET	12	
DAIN to Minneapolis TELENET	15	

Note that DAIN charges are estimates and that the telephone company may raise

its rates. Also note that we have had less trouble with noise interference using the Minneapolis node than using the Milwaukee node.

BRS's entry into the market has influenced the price options available to libraries for on-line data base services. Before BRS, Lockheed and SDC were the only major vendors of on-line services. BRS's new pricing concept was based partly on a commitment to acquire a limited number of data bases so that they could keep costs low, as opposed to Lockheed's and SDC's commitments to make a large number of data bases available. Instead of establishing different on-line charges for each data base (as Lockheed and SDC do), BRS has established incentive pricing with reduced rates for increased usage. All data bases (except MEDLARS which has a constant rate of $10/hour) are charged at the same rate. The user guarantees to use a minimum number of hours in order to establish the rate. In addition to this base rate, BRS charges "royalty" fees for certain data bases (see Appendix C).

Setting up access through BRS involves a lot of cost-figuring and decision-making. (For example, UW-Madison overestimated their potential use of BRS and guaranteed a large number of hours. They used much less than they had agreed to but were still obligated to pay for the total number of hours guaranteed.) Besides choosing the appropriate minimum number of connect hours, the library must choose which contract option they want. MIDLNET acts as a broker for BRS in the Midwest; the options discussed below are those available through MIDLNET. (BRS's options are similar, but MIDLNET offers a lower minimum option and lower rates for all but the 40-hour minimum.)

1. Hourly contract (see Appendix D)

   The user contracts to use "x" connect hours each month for 6 or 12 months, with the rates determined as follows:

number of hours	hourly rate
3 - 4.99	$25
5 - 9.99	22.50
10 -19.99	18
20 -39.99	15
40 +	13

Connect hours are billed monthly.

Hours cannot be carried from month to month, unless the agreement is prepaid on an annual basis. (Note: The MIDLNET contract specifically includes this exception (section 2(6)), but BRS does not mention it in their brochure (see Appendix C, p. 6).)

If the user exceeds the contracted number of hours, he is billed at the same rate until the next level on the rate scale is reached, and then billed at that level. For example, if a user guarantees 5 hours and uses 15, the first 9.99 hours are billed at $22.50/hour and the last 5 at $18/hour. (Note: The MIDLNET contract is unclear on this point; see section 2(3). The summary given here is from BRS's brochure; see Appendix C, p. 6.)

2. Subscription (see Appendix E)

BRS began offering this option in January, 1977, in order to solve a bureaucratic problem for libraries; contracts seem to require more red tape than subscriptions. The terms of the subscription option are similar to the contract option except for the following:

a. the subscription must be paid in advance;
b. hours may be carried from month to month;
c. connect hours used in excess of those guaranteed are billed at the same rate.

The third difference requires more examination. The subscription rates are as follows:

rate/year	average hours/mon.	hourly rate
$ 900 for 36 hours	3	$25
1350 for 60 hours	5	22.50
2160 for 120 hours	10	18
3600 for 240 hours	20	15
5700 for 480 hours	40	13

If we subscribed to 5 hours/month, we would pay a minimum of $112.50/month. If we actually used 8.5 hours (our average now for ERIC), we would pay $191.25/month. But, if we subscribed to 10 hours/month (even though that would be higher than our actual use), we would pay $180/month.

BRS offers the advantage of lower rates, but the disadvantages of a guaranteed

minimum cost and a complex fee structure. The minimum number of hours could cause problems for us at Stout. Right now, our ERIC usage varies greatly each month. For example, in 1977 we used the following numbers of hours:

January	5.1 hours	July	11.9 hours
February	11.5	August	5.4
March	16.7	September	9.3
April	9.9	October	3.5
May	2.1	November	7.3
June	14.0	December	4.8

Unless we paid annually in advance so that we could carry hours from month to month, it would be difficult for us to take advantage of BRS's lower prices for higher usage.

Partly as a result of BRS's lower prices, Lockheed instituted new pricing options in January 1977 (see Appendix F). Rates for two of their data bases were reduced as well as TELENET and TYMNET charges. Lockheed now offers these discount services: (SDC also offers discounts after 4.99 hours of use, but complete information was not obtained.)

1. Standard "no minimum" discount

   Whenever a user exceeds 5 hours/month of connect time, the following discounts apply:

hours used/month	discount per hour
0 - 4.99	$0
5 - 9.99	5
10 - 19.99	9
20 - 39.99	12
40 - 79.99	14
80 +	15

   For example, if a user accumulated 26 hours of use in a given month, the discount would be determined as follows:

hours	discount rate	discounted hours	discount
0 - 4.99	$ 0	5	$ 0
5 - 9.99	5	5	25
10 -19.99	9	10	90
20 -39.99	12	6	72
		26	$187

The total discount would be $187. If the 26 hours happened to be used in a data base that cost $25/hour (like ERIC), the total charge for the month would be $463 (26 hours x $25/hour - $187), or about $18/hour.

2. Special minimum monthly contract

   Even greater discounts are available if the user guarantees at least $200/month connect time. See Appendix F, p. 3 for a full explanation. This option is similar to BRS's contract option with lower rates for higher minimums, plus lower rate levels for excess hours.

The options listed above give Lockheed users the advantage of lower prices, making Lockheed's prices nearly as low as BRS's. In the example used under (1) above if the user had used BRS to access ERIC instead of Lockheed, the charges could have been $15/hour (if the user had subscribed to 20 hours/month of service), which is very close to Lockheed's effective cost of $18/hour. (For more expensive data bases, the rates would not be as close.)

The following is a table showing the availability and rates for the data bases discussed in section I as potentially useful at Stout. (Complete lists of the data bases available from each vendor and their rates may be found in Appendices A, B, and C.) Lockheed and SDC rates are listed in the form charge per connect hour and charge per citation printed off-line. Lockheed rates do not reflect the discounts available; i.e., the rates listed represent the highest possible rate. BRS rates are listed as "($25)", the highest possible rate for BRS. Note that for BRS certain years of many data bases are available only for searching on-line; results must be printed off-line. Note also that telecommunications charges are not included for any of the vendors. The information listed is current as of fall, 1977.

data base	Lockheed	SDC	BRS
AGRICOLA	1970- $25; 5¢	1970- $35; 6¢	1975- on-line 1970-74 off ($25)
AIM/ARM	1967- $25; 10¢	--	--
ASI	--	1973- $100; 25¢	
CAB Abstracts	1973- $65; 15¢	--	--
Cambridge Scientific Abstracts	--	1975- not up yet	--
ERIC	1966- $25; 10¢	1966- $35; 8¢	1966- ($25)
FSTA	1969- not up yet	1969- $65; 12¢	--
MEDLARS	--	--	1975- on-line 1966-74 off $10
NICEM	1964- $70; 20¢	--	--
NTIS	1964- $35; 10¢	1970- $45; 8¢	1975- on-line 1970-74 off ($25) + 10% royalty
Psych Abstracts	1967- $50; 10¢	1967- not up yet	1967- ($25) + $20/hr. royalty
SAE Abstracts	--	1965- $80; 15¢	--
ABI/INFORM	1971- $65; 10¢	1971- $65; 10¢	1971- ($25) + $30/hr. royalty
BIOSIS Previews	1972- $45; 15¢	1972- $65; 10¢	1975- on-line 1970-74 off ($25) + $15/hr. royalty
CIS	--	1970- $100; 25¢	--
COMPENDEX	1970- $65; 10¢	1970- $65; 10¢	--

Exceptional Child Education Abstracts	1966- $25; 10¢	--	--
ISMEC	1973- $65; 12¢	--	--
LISA	not up yet	1969- $50; 10¢	--
SOCIAL SCISEARCH	1972- $70; 10¢	--	--
Sociological Abstracts	1963- $55; 15¢	--	--
TITUS	--	? $75; 15¢	--

One more word about off-line printing. The decision of whether or not to print off-line can be based on several factors: direct cost, desired turnaround time, staff time at the terminal, etc. (Wanger, 1976) The direct cost trade-off can be computed fairly easily from the charge/hour for searching the data base, telecommunications charges/hour, and the number of seconds it takes to print a citation on-line. For example, if the data base + telecommunications charges were $25/hour and it took 10 seconds to print a citation, the charge would be 7¢/citation printed on-line. If the off-line charge were 10¢/citation, the direct-cost factor would favor printing on-line.

One more aspect of pricing needs to be considered--start-up costs. Four factors can be identified: training of search personnel, search aids, hardware, and publicity. (Staff costs will be examined in section III.) The first two factors vary with each vendor, and the last two depend on local decisions.

The cost of training search personnel is often underestimated. "An effective training program must include an introduction to the fundamental concepts underlying the use of computers for bibliographic searching, the features of the computer system(s) through which the data bases are accessible,

and the substance and organization of the machine-readable form of the data bases themselves. The training process requires both intellectual effort and hands-on practice in the use of the terminal." (Wax, 1976) All three vendors offer optional but recommended workshops in the use of their systems. The costs of these workshops vary: Lockheed charges $50 for one-day sessions at their facilities and $200 per day plus transportation and per diem for on-site sessions. (SDC and BRS are not specific about the costs for their workshops.) To help searchers learn particular data bases, the data base producers offer workshops around the country at various times. In order to allow for hands-on experience, SDC and Lockheed offer free connect time in the first month of service: SDC, 2 hours; Lockheed, $100. Wax (1976) notes, however, that this practice time may not be sufficient for the searchers to become proficient in the system. (Wanger (1976) reported that searchers need 1-4 weeks to feel comfortable searching.) To summarize, training search personnel may incur the following costs: registration and possibly transportation for workshops by the vendor(s), registration and transportation for workshops by data base producers, and on-line connect time for practice.

Search aids take two forms: user manuals prepared by the vendors, and thesauri and other information prepared by the data base producers. The basic user manual is supplied by the vendor when service begins. The user manual explains the software commands and summarizes data base content and structure. Lockheed's manual costs $10; BRS and SDC do not list their prices. Manuals for specific data bases are also available from the vendors. (Lockheed's 25-data base manual costs $25.) In order to search data bases effectively, the searcher must use the data base's thesaurus, if one exists. Thesauri are usually prepared by the data base producer, but are sometimes prepared by a vendor when no subject authority has been established (e.g., SDC/CAIN Keyword Index).

Thesauri vary in price from $10 to $60. Other search aids, such as usage frequency reports, merged subject lists, lists of journals indexed, and dictionaries, can be helpful for developing efficient search strategies. Wax (1976) includes a representative list of essential search aids and other aids available for several data bases. The total cost for search aids would depend on which data bases the institution decided to search and what aids were available for those data bases. (At Stout we presently spend about $50 each year for search aids for ERIC.)

Hardware decisions should be based on the number of searches the institution expects to perform. Help in choosing terminals is available from the vendors as well as from printed sources. Decisions must be made whether to get a CRT terminal, a printer, or both. CRT terminals are not necessary for searching with the major vendors. (NYTIB seems to be the only data base available that requires a CRT.) Printers can be impact or thermal, with varying dot matrix patterns for thermal printers. Some terminals require a separate modem for the telephone connection. The speed of the terminal is another factor. All three vendors can handle 110, 300, and 1200 baud terminals (i.e., 10, 30, or 120 characters per second). The volume of projected use influences the number of terminals to be acquired and the speed chosen. At Stout we already have a CRT terminal with 100, 300, 1200 and higher baud capabilities, a tape cassette unit with on-line recording capability up to 1200 baud, a modem with up to 300 baud capability, and a thermal printer with up to 300 baud capability. With the new film rental system coming on-line and the potential for direct input to the Stout computer center, we will certainly need to acquire another terminal if we expand our use of on-line data bases. The new terminal configuration could be tailored to the internal data processing needs, to more powerful data base searching capabilities, or to both.

Upgrading our searching capability to 1200 baud is one possibility. Higher search speeds can offer the following advantages:

1. More on-line printing to avoid turnaround mail time for off-line prints;
2. Increased search interaction by allowing time for checking thesaurus terms on-line and checking index terms on particular records;
3. Decreased search time for straightforward searches. (Stewart, 1977)

Searching at higher speeds may not imply cost-savings. If the searcher uses the first and second advantages listed, he may spend the same amount of time on-line, but he may provide better service at the same cost; i.e., more cost-effective searching. Trivizas (1977) noted the following:

1. Higher speeds only imply faster printing of the computer's responses; the searcher still must think and type at her own speed;
2. 1200-baud transmissions are too fast to read, but with 300-baud transmissions the searcher's mind may wander because they are too slow.

At Stout we could search and print at 1200 baud simply by acquiring a 1200-baud modem. Transmissions could be recorded on-line onto the tape cassette unit and later printed on the thermal printer at 300 baud. There may, however, be copyright problems involved in taping the transmissions.

The last aspect of start-up costs is publicity. The scope and audience of publicity about a new search service depend on the decision made about which data bases to offer and also on a decision about what volume of service to offer. (This decision is related to the question of budgeting or charging for the service, which will be examined later.) Publicity could vary from announcements to library staff through brochures and mailing campaigns to demonstration/workshops. The cost of the publicity would depend on the scope chosen.

The cost of a new service is an essential factor in the decision to offer it. The direct cost of on-line searching, to summarize, is made up of these

factors:

on-line connect time
off-line printing
telecommunications
rates for data bases searched (including discounts)
training personnel
search aids
hardware
publicity

All these factors, except the last two, are directly related to the vendor that is chosen. Staff costs and other implied costs will be discussed in section III.

Major Vendors--Software

Comparing software systems can be a very complex undertaking. All three vendors have developed sophisticated searching systems with similar but not identical features. Wanger (1976) notes that system capabilities rank fourth (after data base availability, cost, and personal preference) as a factor in the searchers' decisions to use one system over another. At Stout, software capabilities may be less important than other factors (like cost). A comparison of software can be useful, however, in estimating cost-effectiveness of one system over another. For example, BRS's software is regarded by some users as clumsy. For those users, the efficiency they can achieve using SDC or Lockheed balances BRS's seemingly lower charges. Also, for certain questions in ERIC, we may want the option of a more sophisticated searching system than MACC can provide. (MACC will be examined more fully later.)

Several authors have listed criteria to use in evaluating software systems. Brandhorst and Eckert (1972) note the following as desirable system features:

1. Ability to enter any command at any time;
2. Ability to select which records or elements to print;

3. Ability to qualify retrievals by date or language or other qualifier;
4. Ability to print on-line or off-line;
5. Unrestricted use of Boolean operators and number of search terms;
6. On-line thesaurus;
7. Ability to link search statements;
8. Protection against file or program destruction;
9. User query language as close to natural as possible.

Marshall (1975) adds "ability to use word adjacency." Wanger (1976) identifies more specific search-related features (listed here in the order of importance described by searchers). "The system allows a user to:

1. Use all Boolean operators (AND, OR, AND NOT);
2. Combine terms with one or more operators in one instruction to the system;
3. Incorporate previous searches, by number, in new search statements or entries;
4. Truncate or enter word-stems to retrieve on all possible suffixes;
5. Specify the data element (i.e., field or category) from which the term is to be searched;
6. Search character strings sequentially or serially in fields or categories that are not directly searchable;
7. Store a search that can be run again at a later time;
8. Use word-proximity operators;
9. Use relational operators (greater than, less than, between)."

Wanger (1976) also lists the following on-line-aid features:

The system allows the user to:

1. Receive announcements on-line from the supplier about important system-related information;
2. Monitor elapsed time or CPU usage on-line;
3. Display on-line the alphabetical index or dictionary;

4. Display on-line the list of related terms or hierarchical thesaurus;

5. Display history of search strategy;

6. Enter several instructions to the system at one time;

7. Obtain explanations of system features on-line;

8. Control the length or form of system messages;

9. Enter comments on-line to the supplier;

10. Enter comments on-line to other terminals;

and the following output features:

The system allows the user to:

1. Specify offline printing of search results to be run by the supplier;

2. Request standard or predefined print formats;

3. Tailor his or her own print formats;

4. Specify sorting of output by designated categories (e.g., author, year);

5. Specify sorting of output by number of hits;

6. Have a search strategy entered on-line run in batch mode by supplier;

7. Receive citation displays in upper and lower case.

Weiss (1976) examined the factors of searcher keystrokes and time availability.

All three vendors do fairly well by these criteria: most of the features seem to be standard now for on-line search systems. The differences appear in more specific features. Please refer to the criteria as listed above. (The information presented here is derived from Stockey and Basens (1977), Weiss (1976), and vendors' brochures.)

Lockheed (DIALOG) --

Brandhorst and Eckert

2. Several print options, but not complete freedom to choose any elements.

9. Long versions of commands are like natural language; short versions

are punctuation marks with no relation to the command-words, or the first letter of the long command.

Marshall - Can search x next to y, x a specified number of words or less from y, x and y in the same field, x and y in the same citation

Wanger (I)

9. This capability is not mentioned in any materials I've seen.

Wanger (II)

3. Displays a total of 20 lines alphabetically on either side of the term

4. In alphabetical display (3), notes existence of related terms, so display is possible

6. Can't combine terms and set numbers in one Boolean statement, but can enter more than one statement at once

8. Capability not mentioned

10. Capability not mentioned

Wanger (III)

3. See Brandhorst and Eckert (2)

5. Capability not mentioned

6. Capability not mentioned

7. Capability not mentioned

Weiss - DIALOG, with its short-version commands (one character instead of a whole word), requires considerably fewer input strokes. DIALOG requires fewer steps with certain commands, such as adjacencies and requesting elapsed time. Data bases are available during all normal working hours, plus some evenings.

The major drawback of DIALOG seems to be its limited print formats. DIALOG's major strength is its abbreviated commands. For example, in one line, a searcher can enter an entire search:

S AUTO?; S WOM?N; S FEMALE?; S FEMININE; C 1*(2+3+4); T 5/5

That one line searches 4 terms (3 of them truncated), combines them in a Boolean strategy, and requests an on-line printout.

SDC (ORBIT) --

Brandhorst and Eckert

1. Getting out of thesaurus-listing requires a special command to bypass the system.

2. Selection of print formats, plus complete freedom to print specific fields

3. Limit only by date

5. Can hold only 25 "search statements" (a single term or combinations of terms) at one time; sets may be carried over into the next 25

9. Makes a distinction between commands, which require a ", and other operations

Marshall -

"Stringsearch" and "sentencesearch" capabilities allow x next to y, x in the same sentence as y, x in the same field as y. Searches only one field at a time; format much trickier than DIALOG

Wanger (I)

4. Allows left-hand truncation in addition to right-hand; also, as in a KWIC index, can search for terms with other words before or after

7. Capability not mentioned

9. Capability not mentioned

Wanger (II)

3. Prints only 5 terms (2 on each side of search term), plus up to 10 more on either side if requested

4. Capability not mentioned

5. Capability not mentioned

6. Capability not mentioned

9. Capability not mentioned

10. Capability not mentioned

Wanger (III)

4. Capability not mentioned

5. Capability not mentioned

6. Capability not mentioned

7. Capability not mentioned

Weiss -

Some ORBIT commands can be abbreviated to 2 or 3 letters, but never to one. Inputting search terms does not require any command, making that step shorter than in DIALOG. AND, OR, and AND NOT are never abbreviated. Responses from the computer are considerably longer than in DIALOG. At the time of Weiss's article, not all SDC's data bases were available at the same times. Compared to Lockheed, specific data bases were available 28-64 less hours per week.

ORBIT offers slightly less flexibility in its adjacency capabilities, more flexibility in print formats, and much longer searching procedures. The limited hours of availability (if still the same) could interfere with an on-line search service.

BRS (STAIRS) --

Less information is available about BRS's software because it is such a recent system. Certain capabilities "not mentioned" may actually be available.

Brandhorst and Eckert

3. Capability not mentioned

5. Allows combination of search terms and set numbers in one statement

9. Commands preceded by ..

Marshall -

Allows x next to y, x in same sentence as y, x in same field as y, x in same citation as y

Wanger (I)

4. May specify numbers of characters after truncation (e.g., INFANT$1 to get INFANT and INFANTS but not INFANTICIDE)

Wanger (II)

3. Capability not mentioned

4. Can "explode" search term to automatically include more specific terms

5. Capability not mentioned

8. Capability not mentioned

10. Capability not mentioned

Wanger (III)

5. Capability not mentioned

7. Capability not mentioned

Weiss -

> Neither a list of commands nor a time schedule were available to evaluate by these criteria.

One major difference in STAIRS does not appear through these criteria: the format for entering search terms. STAIRS can only read single terms, not phrases. In order to search a term like Elementary Schools, the term must be entered as ELEMENTARY-SCHOOLS. One problem with this feature is that the system cannot distinguish between a phrase that is an index term and a hyphenated word. For example, DATA-BASES would retrieve citations with "data bases" as an index term, and also citations with the word "data-bases" appearing anywhere in the citation. This could result in many irrelevant citations. Ways are available to bypass this problem, but it adds a strange quirk to remember when inputting search terms. STAIRS offers the greatest flexibility in adjacency-searching. Without an on-line thesaurus, certain search refinements would be impossible in STAIRS. One advantage of STAIRS is the capability to combine terms and set numbers in one statement.

To summarize, all three vendors offer basic (but sophisticated) searching capabilities. DIALOG is limited in print formats and slightly in adjacency-searching. ORBIT is limited in length of search commands and lack of an on-line hierarchical thesaurus. STAIRS is limited in its input format and lack of any on-line thesaurus.

Major Vendors--Service

Evaluating service can be a very subjective process. Aside from determining whether the vendor offers certain services, the perception of that service by users is a very important factor. I was not able to talk to a large number of users, but their reports are helpful in evaluating the vendors.

Lockheed offers:

- 43 (or 51, depending on how you count) data bases available; 16 out of the 22 Stout might use
- 93 hours/week data base availability
- SDI service for at least 11 data bases
- Beginning and advanced training in the use of DIALOG
- Assistance in choosing hardware
- An 800 telephone number for help while on-line
- Monthly newsletter

Lockheed has a good reputation with its users for being responsive to system suggestions and searching problems. (I was warned, however, about a representative in Chicago.) Lockheed (like SDC) is easy to try on an experimental basis because there are no monthly minimums for usage.

SDC offers:

- 35 data bases; 14 out of the 22 Stout might use
- SDI service not mentioned
- Beginning and advanced individualized training in the use of ORBIT and of specific data bases
- An 800 telephone number for help while on-line
- Monthly newsletter

SDC has been used less by searchers lately because of its higher costs. It has a good reputation with its users, however. SDC claims to offer better service

and better search aids than other vendors.

BRS offers:

12 data bases; 7 out of the 22 Stout might use

Limited on-line availability for printing

SDI service on all data bases

Beginning and advanced training in STAIRS and in specific data bases

User Advisory Board

No 800 number listed, but help available by phone or terminal

Newsletter

BRS operates with a more explicit philosophy than SDC and Lockheed. According to one user, BRS developed out of a group of libraries' dissatisfaction with the SUNY Biomedical Network. BRS's software (both based on STAIRS), personnel (the highest officers in BRS all worked for SUNY), and data base offerings reflect connections with SUNY. Perhaps because of this background, BRS attempts to be especially responsive to user needs. They have established a User Advisory Board to formalize user input into their management decisions. At a recent user meeting, BRS agreed to add more social science data bases because their users requested them. BRS also emphasizes user training very heavily. On the other hand, BRS's day-to-day contacts with users have gotten a mixed response. One user noted that BRS telephone advisers are not very helpful with problems, often blaming them on hardware instead of helping the user diagnose them. Another user remarked that the search system was awkward and computer response time very long. One advantage for Stout is that BRS has a service office in Minneapolis; Lockheed's and SDC's closest offices are in Chicago.

BRS's on-line printing policy has been mentioned by some users as

troublesome. BRS decided to make only more recent years available on-line for two reasons:

1. Economic - The cost of on-line storage devices increases with the number of citations available on-line;
2. Practical - A survey of on-line users revealed that most printout are done off-line; on-line time is used to refine search strategy.

BRS's policy should work for those users who do print off-line, but it is still a limitation.

To summarize, BRS, which has attempted the most interactive user-vendor relationships, has a lower service reputation than SDC or Lockheed. All three offer information for keeping up-to-date as well as specific help for problems as they happen.

Summary--Major Vendors

Deciding which vendor or vendors to access through depends on many factors. This section has examined those factors for the three major vendors. The following conclusions may be drawn:

1. BRS offers the lowest overall prices, but the least selection of data bases; they also require a certain level of use.
2. Lockheed and SDC offer a wide variety of data bases with partial overlap, similar low start-up costs, and pay-as-you-go pricing.
3. SDC's prices are generally higher than Lockheed's.
4. BRS is the only major vendor who offers MEDLARS.
5. Lockheed's DIALOG offers more of the desirable software features than ORBIT or STAIRS, and seems easy to use.
6. BRS has a mixed reputation of responsiveness to users, while Lockheed and SDC both have good reputations.

The vendor decision will also depend on the scope of service to be offered, as determined by the needs assessment discussed in the introduction. Accessing through Lockheed or SDC would give us more flexibility to test potential use than BRS would, but at the cost of higher charges per hour.

Other sources

Accessing through one or more of the major vendors is not our only alternative. This section will discuss other ways we could provide on-line search service to our patrons.

Other sources--MACC

Stout presently accesses the ERIC data base through UW-Madison's academic computer center (MACC). Although the scope of its operation is very different from that of the three major vendors, MACC's service can also be examined in terms of cost, software and service.

MACC charges are not determined solely in terms of on-line connect hours. Rather, use is billed in terms of the kinds of charges computer centers count:

CPU time	cards in
file I/O request	pages printed
file I/O words	shared files
swap requests	connect minutes
swap words	ER + CC
memory usage	job charge

When the total charges are compared with the time on-line, MACC charges average about $15 per hour. (Compare this to Lockheed at $25/hour, SDC at $35/hour, and BRS with $15/hour at a 20 hour/month minimum.) Offline print charges vary with the turnaround time: printouts done the same day are 10¢/citation, printouts done at the convenience of MACC (usually the following weekend) are 3¢/citation. (Compare with Lockheed at 10¢/citation, SDC at 8¢/citation and BRS at 10¢/page.) We usually print on-line, however. In addition to MACC's charges, we pay $3.60/hour for DAIN-line charges to Madison.

MACC's software (WISE) offers only some of the features that are standard with the major vendors.

1. CIJE and RIE are two separate files in MACC, requiring two separate searches, though search strategy can be saved from one data base to the other.

2. Print formats are standardized and only two are available--full citations with abstracts (only off-line) and short citations (only on-line).

3. Only thesaurus terms may be used as subject search terms, i.e., full text searching with adjacency and truncation capabilities is not available.

4. No on-line thesaurus is available, either alphabetical or hierarchical.

5. Searches can be made by author or clearinghouse code, and limited by date.

6. Set numbers and terms may be combined in one search statement.

7. Search language (except for the log-on) is close to natural language.

8. Messages may be sent to other terminals.

9. Explanations of search commands are available on-line.

10. The system has 1200-baud capability.

Despite the limitations of MACC's system, the basic searching capability it offers may be sufficient for most Stout searches.

Service with MACC operates on a much more personal level than with the big vendors. Workshops are held fairly frequently in Madison with minimal charges to participants. Help is available for system and searching problems. Users themselves correspond and assist one another through the "conference" program. MACC has also discussed adding Psych Abstracts, but no estimate has been made of when it might be available.

MACC has worked out very well at Stout for searching ERIC. MACC is cheaper than the three vendors, but it doesn't offer as many capabilities. A possible configuration for an expanded search service could be MACC for ERIC, plus SDC and/or Lockheed for access to other data bases and the option of more sophisticated searching on ERIC. BRS would be a less desirable choice with MACC if we wanted to use more data bases than BRS offers, and if our estimated use of data bases other than ERIC was low. That is, we could not

take advantage of the savings BRS offers for higher usage if most of our usage ended up with MACC for ERIC. On the other hand, with their expected price increases, MACC may cost about the same as the major vendors while offering much less service. In that case, the decision of which vendor to use will return to the three major vendors, with the decision based upon the factors discussed earlier in this section.

Other sources--Other libraries

Instead of accessing data bases directly, we could offer a search service using the resources of another library. We presently access MEDLINE through UW-Madison's medical library, sending our requests to them and waiting for a reply. This kind of arrangement has several advantages:

1. We avoid some of the costs of on-line searching because we are billed mostly on the basis of direct vendor charges.;

2. We can take advantage of the expertise of librarians who search the same data bases (or at least use the same system) frequently enough to know them well.

Searching through another library has the following disadvantages:

1. Turnaround time could be very lengthy; the process could eliminate service for short-term projects, especially when the turnaround time for retrieving the documents (often through interlibrary loan) is added.;

2. The quality of the search and the interactive capability of the on-line system would be hampered because the searcher has not discussed the question with the requester directly.

The second disadvantage could be overcome by making arrangements for the requester to talk to the searcher by telephone (after a preparatory interview with a Stout librarian).

The following options, at least, may be available to us for accessing through another library:

1. UW-Madison Memorial Library --

   Emphasizes data bases in the social sciences and humanities through

BRS and Lockheed (recently added)

Charges depend upon the vendor used:

BRS - 50¢/minute connect time
15¢/page off-line printing
$1.50 processing and postage

Lockheed - on-line connect time, off-line print charges, and TELENET charges as billed by the vendor
$1.50 processing and postage

2. UW-Madison Engineering Library

Emphasizes data bases in science and technology, through BRS, Lockheed, SDC, and NLM (National Library of Medicine)

Charges depend upon the vendor used:

BRS - same as Memorial

Others - minimum $3.25 per question (not per data base)
vendor charges for on-line time and printing, plus about 20¢/minute for overhead
postage

3. UW-Madison Steenbock Library

Emphasizes data bases related to agriculture

Charges - vendor charges for on-line time and printing

(This library was less enthusiastic about the possibility of serving our patrons through their library.)

4. James J. Hill Reference Library (St. Paul)

Data bases available through BRS; their subject expertise is in business and economics

Charges - 50¢/minute on-line time; $5 minimum
$2 off-line printing

5. UW-Eau Claire

Recently instituted service through Lockheed; no details known

Accessing on-line data bases through another library seems most feasible if we do not expect to be searching often enough to keep our searchers well-trained and efficient. That is, we may be able to fulfill the occasional request more effectively through another library.

III. IMPLICATIONS

The effect of on-line searching on other services of the library is another factor in the decision to expand search services. Additional hidden costs must be identified, as well as philosophical issues. This section will discuss the implications of on-line searching in terms of staffing, effect on interlibrary loan, and the question of charging patrons for the service.

Staffing

The cost of staffing an on-line search service is often overlooked. With the advent of on-line searching and the many studies "demonstrating" the lower cost of on-line vs. manual searching, many libraries have decided to offer on-line search services. But, as Wax (1976) and Wanger (1976) note, most academic libraries did not offer any customized bibliographic search services before they began on-line searching. For those libraries, the "cost-saving" of on-line searching is misleading because they had never before spent the staff time that manual searching requires. As noted in the introduction, it is the students' and faculty members' time that is saved by providing search services in academic libraries, not the library staff's time. The decision to expand on-line searching at Stout must include a commitment to staff it as a new and additional service of the library. That is, unless additional staffing can be acquired to provide the search service, some other library activity must be curtailed in order to reallocate staff time.

How much time an on-line search service requires has not been firmly established. Cooper and DeWath (1976), Griffith (1976), and Wanger (1976) outline the steps involved in a search:

1. Initial patron interview
2. Preparation of search strategy
3. On-line searching
4. Review of results for relevancy (screening)
5. Explanation to patron

One could also include administrative time for budgeting and preparation of reports, and clerical time for billing or other record keeping. Some researchers only report the time actually spent on-line (e.g., Hawkins, 1976). Others are not clear as to whether they are counting a "search" as one patron question or one data base accessed. The following are examples of the variations reported:

Hawkins (1976) -- 30 min./search, on-line time only
one search = two data bases accessed

Wanger (1976) --

	all users	educational users	heavy (50+/mon.) educational users
pre-search	10 min.	26 min.	15 min.
on-line	15	22	16
post-search	10	16	11
	35 min.	64 min.	42 min.

Cooper and DeWath (1977) --

	free to patrons	1/2 charged
total time	49 min.	55 min.
interview + search-preparation	22	34
on-line	23	16

Griffith (1976) --

15-20 min.	interview
30-60	strategy-writing
10-40	on-line
30-60	screening
30-60	explanation (to a class)
115-340 min.	

Wax (1976) -- 2 hours/search, with 1 hour for search-preparation for beginning searchers

Pensyl and Woodford (1977) --

10 min./search, down from 25 min./search when decentralized
2 full-time searchers + half-time clerk do 150 searches/week, or 48 min./search, including administrative time

Although the final times reported vary greatly, several observations can be made. Both Wanger (1976) and Pensyl and Woodford (1977) note a drop in search

time with an increase in volume. Comparing Wax (1976) with Pensyl and Woodford (1977) yields the same conclusion: both papers discuss the NASIC search service, before and after centralization. Evidently when searchers do more searches or devote a larger percentage of their time to searching, they do more efficient searches. Cooper and DeWath (1977) note another variation: when the libraries began charging their users, the searchers spent more time preparing the search and less time actually on-line, in order to hold down the cost to their patrons.

At Stout, for ERIC we use about 40-45 min./search:

5 min.	initial interview (reference desk)
15	interview with ERIC librarian, including strategy-writing
10-15	on-line, including printing
5	record-keeping and processing
5	screening
40-45 min.	

Or, if we figure time another way:

15 hrs./week, ERIC librarian
8 hrs./week, keypuncher at 782 searches/yr.
yields 64 min./search

These results fall within the range defined by Wanger (1976), Cooper and DeWath (1977), and Pensyl and Woodford (1977) of about 40-65 min./search. It does not seem unreasonable to estimate that, at the volume we are presently generating, a search requires about one hour, with more time allowed if searching becomes less frequent for each searcher, and less time if searching becomes more frequent. We might also estimate that if we decide to charge for the direct costs of the service, the total time required for a search will increase, while the actual on-line time (and thus the direct costs) will decline.

One other aspect of staffing needs to be considered: who is the searcher? Most of the literature on on-line searching assumes that a librarian

or information specialist acts as an intermediary between the patron and the on-line service itself. Wanger (1976) reported 89% of the searchers in educational institutions were such intermediaries. The literature also seems to assume that this librarian-intermediary is the person who actually sits down at the terminal. There is more discussion of whether or not to have the patron present during the search (e.g., Wax, 1976; Cooper and DeWath, 1976) than of whether or not to use someone other than a librarian to key-in the search. The assumption seems to be that the point of on-line searching is the interaction between the searcher and the system, allowing for immediate modification of the search. Delegating the actual terminal work to someone less skilled in the question-formulation and evaluation tasks of the librarian limits the value of the on-line search and tends to return the searching to an off-line mode. At Stout, we have delegated searching to the keypunch operator presumably because we did not want to take up the (expensive) librarian's time. But we may well have sacrificed some of the quality we could have with the librarian searching directly. As Wax(1976) notes, there are clerical tasks involved in a search service (especially when the library charges patrons), and these must be minimized if a librarian is doing them. But the actual searching (interview, strategy-formulation, on-line interaction, and evaluation) lies within the special skills of librarians. If we decide to expand on-line searching at Stout, we must carefully weigh the personnel-cost-saving of using a keypuncher to do searches with the potentially greater quality of using a librarian.

Interlibrary loan

The impact of an on-line search service on interlibrary loan activity is another significant implication of expanding service at Stout. "To the end user, a bibliographic search system is not an end in itself, but only a means

to an end. Unless physical access can be had to the documents referred to in a literature search, that search is of little value to the user." (Fosdick, 1977). Wanger (1976) identified document delivery as a problem connected with on-line searching, and researchers have just begun measuring that problem. In a study of on-line searching in San Francisco Bay Area public libraries, Firschein and Summit (1977) reported that only 22% of the patrons who used the service actually obtained any of the items retrieved in the library where the search was done. 46% went to college libraries in the area for one or more items. Higchingham (1976) noted that 54% of the relevant citations were not available in her users' library. The close proximity of other large universities held the actual interlibrary loan requests down to only 4.1% of the citations, however. In a situation where patrons did not resort to other libraries, Hawkins (1976) reported an astonishing 67% increase in interlibrary loan requests following the introduction of on-line searching. Most of the increase seemed to result from a few large searches in a new area of study. Pensyl and Woodford (1977) noted that it wasn't unusual, after on-line searches, for the interlibrary loan office to get requests for 15-30 items at one time. Martin (1977) had a 167.7% leap in interlibrary loan activity following the introduction of on-line searching. 60% of the patrons who had searches also made interlibrary loan requests. 56% of the managers in Wanger's study (1976) reported moderate to significant growth in requests for full text copies. At UW-Milwaukee, Schatzman (1977) noted that 18% of all interlibrary loan requests from July-December, 1976, directly resulted from on-line searches.

At Stout we might expect a fairly heavy impact on interlibrary loan if we expand on-line searching. It is likely that if we get more involved in specialized data bases, we will be less likely to own many of the sources

cited. Because Stout is not located near any large collections to supplement our own, our patrons would have to rely on interlibrary loan to get copies of the items identified in the search. At present, it is difficult to determine how much interlibrary loan activity already results from the ERIC searches we do. (One reason ERIC may work out well at Stout is that we can supply most things from RIE and many from CIJE out of our own collection.) The increase we may experience will probably exceed the ~~most~~ modest 18% seen at UW-Milwaukee. On-line bibliographic searches are most often done for graduate students and faculty (85% of all ERIC searches at Stout); interlibrary loan requests are most often made by graduate students and faculty (80% of all requests, 1976-77). It seems likely that increasing bibliographic access to the same group of people that already accounts for most interlibrary loan activity will certainly increase interlibrary loan requests considerably. The sources requested may also become more specialized, requiring more verification time by interlibrary loan staff. But even if we experienced only an 18% rise in interlibrary loan activity, that increase would require additional staffing and supervision, adding to the strain interlibrary loan has already faced.

To charge or not to charge

The question of whether or not to charge patrons for on-line bibliographic searches divides librarians into three camps: a very vocal group that objects to charging on philosophical grounds, another group that maintains charging is nothing new in libraries, and a third group that wishes they could provide the service for free but can't afford it. This section will present the arguments of the three groups and discuss the implications of charging or not charging.

The "free" group rests its case on the presumed right of access to information.

As NCLIS puts it, their goal is:

> To eventually provide every individual in the United States with equal opportunity of access to that part of the total information resource which will satisfy the individual's educational, working, cultural and leisure-time needs and interests, regardless of the individual's location, social or physical condition or level of intellectual achievement. (NCLIS, 1975)

Libraries, this group says, have traditionally provided their services free. The whole concept of a publicly-supported library is that is services are free to its constituents. When libraries institute fees, they are creating barriers to information for those who cannot afford to pay--a form of censorship. "The right of free expression is meaningless without the right of access to information." (Caldwell, 1977; Berry, 1977)

On the other hand, other librarians argue that library service hasn't always been free, nor should it be. One library historian notes that libraries have charged patrons for interlibrary loan, rental books, bibliographies, use of special collections, lost cards, use of genealogical, use of meeting rooms, even use of dictionaries after 15 minutes. (Berry, 1977) Others note that photocopying is hardly ever a free service in libraries. (De Gennaro, 1973; Wax, 1976) Still others note a distinction between "customized services and ready reference or referral services" (Atherton, 1977): libraries may feel justified in charging for specialized service for the benefit of a single patron, as opposed to service offered to all patrons. To this group, providing on-line searches is a service above and beyond normal library service. Access to information exists through indexes and other tools normally provided by libraries; people who want the time-saving advantage of an on-line search ought to be willing to pay for that advantage. In fact, to many librarians in this group, fees are a way to limit frivolous use of the service. (De Gennaro, 1973; Christian, 1975; Hitchingham, 1976)

The last group recognizes that searching is a very expensive service and that they may not be able to absorb the whole cost. In the public sector it is "unlikely that a library will receive additional funds to support on-line services." (Ahlgren, 1975) Academic librarians have been very hesitant to reconcile these financial facts of life with their philosophies of library service. Nitecki (1977) reported that 88% of the librarians he surveyed saw cost as a major barrier to providing a search service, but well over half the librarians would only pass 50% or less of the cost over to the patron. Wanger (1976) noted that only 48% of the educational users thought that on-line searching should pay its own way, but 76% actually charged their users. At one library that does not charge patrons, the reference librarians actively encourage manual searches of the indexes instead of computer searching. (Knapp, 1977) Wax (1976) notes that most libraries take a middle position, where start-up and personnel costs are absorbed by the library but the actual direct costs are charged to the patron. "This middle ground implies the philosophical position that it is the responsibility of the library to make information resources available to its constituency, but that customized services of use only to the individual to whom they are provided should be paid for by that individual."

If the decision is made to charge patrons for service, a pricing policy must be developed. Will the library attempt to recover all costs, only direct costs (on-line time, printing, and perhaps telecommunications), or some combination? Wax (1976) describes several pricing algorithms:

1. Subsidized service, with the library covering a certain percentage of the direct costs, or the first "x" dollars:
2. Fixed prices, perhaps for each data base, based on average search times;
3. Per-minute rates, perhaps for each data base.

Most libraries have chosen the third option in order not to penalize patrons with simpler than average searches, and to maintain a visible relationship between the charge and the service provided. The per-minute rate can include factors for staff time and other costs in addition to the direct costs. Wax recommends figuring the charge immediately and presenting the bill to the patron along with the search results.

The decision to charge or not to charge encompasses many factors. But for most libraries, the direct and indirect costs of the service outweigh the desire to provide free access. At Stout we have to consider the following:

whether our patrons can afford to pay for the service
whether the library budget can be augmented or reallocated to cover the cost of searching
whether the added cost of doing the billing would justify the money received.

Whatever we decide, it may be important for our patrons to realize what costs are incurred by the service.

IV. CODA

This report has examined questions related to on-line bibliographic searching at UW-Stout. The decision to expand on-line searching is a very complex one, requiring careful looks at the needs of our patrons, the financial resources of the library (and the university as a whole), and the philosophical orientation of the library. We may well decide, as Linda Hall Library did, that an emphasis on providing the actual documents that our patrons need is more feasible or more important than providing expensive on-line bibliographic access. ("Missouri...", 1977) Or we may determine that our patrons are like Fay Blake's, who most of the time don't need a bibliography. (Berry, 1977) On the other hand, we may decide that on-line searching is an essential service,

to be funded (at least partly) from the library's budget. We must also remember that the field of on-line retrieval is a very fast-changing one. Since this report was started, MACC has changed its pricing structure, several entirely new data bases have become available, BRS has become more responsive to its users, and a major conference has examined the "on-line revolution". Whether we decide to pass on on-line searching for now or to go ahead, we will need to continually examine the new development in the field in order to provide the most effective service. But whatever we decide, we must start with our patrons first -- what do they need and how can we provide it?

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Appendix A.

From "Pick a subject . . . any subject! The DIALOG service has it"

DATABASE (supplier)	Online Connect Time Rate $/Hour	Offline Print Rate Per Full Record
SCIENCE		
AGRICOLA (Natl. Agricultural Library, U.S. Dept. of Ag.)	$25/Hr	5¢
BIOSIS PREVIEWS (Biosciences Info. Service of Biol. Abs., Inc.)	45	10
CA CONDENSATES 1970-1971 (American Chemical Society)	35	8
CA CONDENSATES 1972-1976 (American Chemical Society)	35	8
CA PATENT CONCORDANCE (American Chemical Society)	45	12
CA SUBJECT INDEX ALERT CASIA (American Chemical Society)	60	12
CHEMNAME	60	12
COMMONWEALTH AGRICULTURAL BUREAUX ABSTRACTS (Commonwealth Agricultural Bureaux)	65	15
COMPREHENSIVE DISSERTATION ABS., (Xerox U. Microfilms)	55	12
INSPEC-PHYSICS (Institution of Electrical Engineers)	45	10
SCISEARCH® (Institute for Scientific Information)	70	10
APPLIED SCIENCE & TECHNOLOGY		
APTIC (Air Pollution Technical Information Center, U.S.E.P.A. and The Franklin Institute Research Laboratories)	$35/Hr	10¢
AQUATIC SCIENCE & FISHERIES ABSTRACTS (NOAA)	35	10
CLAIMS/CHEM (IFI/Plenum Data Company)	150	10
CLAIMS/GEM (IFI/Plenum Data Company)	90	10
COMPENDEX (Engineering Index, Inc.)	65	10
CURRENT RESEARCH INFORMATION SYSTEM (USDA)	40	10
ENVIROBIB (Internatl. Acad. at Santa Barbara)	60	15
ENVIROLINE® (Environmental Information Center)	90	20
INSPEC-ELEC/COMP (Institute of Electrical Engineers)	45	10
ISMEC (Data Courier Inc.)	65	12
METADEX (American Society for Metals)	80	12
METEOROLOGICAL ABS. (Am. Meteorological Soc. and NOAA)	50	10
NTIS (National Technical Info. Service, U.S. Dept. of Commerce)	35	10
OCEANIC ABSTRACTS® (Data Courier, Inc.)	55	10
POLLUTION ABSTRACTS (Data Courier, Inc.)	65	10
WORLD ALUMINUM ABSTRACTS (American Society for Metals)	50	10
SOCIAL SCIENCES & HUMANITIES		
AIM/ARM (Center for Vocational Education)	$25/Hr	10¢
AMERICA: HISTORY & LIFE (ABC-CLIO, Inc.)	65	15
ART BIBLIOGRAPHIES MODERN (ABC-CLIO, Inc.)	60	15
ERIC (Educational Resources Information Center)	25	10
EXCEPTIONAL CHILD ED. ABS. (Council for Except. Children)	25	10
HISTORICAL ABSTRACTS (ABC-CLIO, Inc.)	65	15
LANGUAGE & LANGUAGE BEHAVIOR ABS. (Social. Abs., Inc.)	55	15
NICEM (National Information Center for Educational Media)	70	20
PSYCHOLOGICAL ABSTRACTS (American Psychological Assoc.)	50	10
SOCIAL SCISEARCH® (Institute for Scientific Information)	70	10
SOCIOLOGICAL ABSTRACTS (Sociological Abstracts, Inc.)	55	15
BUSINESS/ECONOMICS		
ABI/INFORM (Data Courier, Inc.)	$65/Hr	10¢
CHEMICAL IND. NOTES (Am. Chemical Soc.)	90	20
DEFENSE MARKET MEASURES SYSTEM (Frost & Sullivan, Inc.)	90	20
FOUNDATION DIRECTORY (The Foundation Center)	60	30
FOUNDATION GRANTS INDEX (The Foundation Center)	60	30
PHARMACEUTICAL NEWS INDEX (Data Courier, Inc.)	65	15
PTS DOMESTIC STATISTICS (Predicasts, Inc.)*	90	20
PTS EIS PLANTS (Economic Information Systems, Inc.)*	90	50
PTS FEDERAL INDEX (Predicasts, Inc.)*	90	20
PTS F&S INDEXES (Predicasts, Inc.)*	90	20
PTS INTERNATIONAL STATISTICS (Predicasts, Inc.)*	90	20
PTS MARKET ABSTRACTS (Predicasts, Inc.)*	90	20
PTS MARKET ABS & F&S ABSTRACTS WEEKLY (Predicasts, Inc.)*	90	20

* Available on a six-month trial basis. Permanent service must be arranged through Predicasts, Inc., 200 University Circle Research Center, 11001 Cedar Ave. Cleveland, OH 44106 (216/793-3000)

Appendix B.

SDC Search Service

ORBIT DATA BASES

ORBIT ACCOUNTANTS INDEX

Provides access to the literature related to accounting, auditing, taxation, data processing, investments, financial management, financial reporting, and management. The coverage is international in scope including English-language books, speeches, pamphlets, government documents and journals from the U.S., Canada, England, Australia, South Africa, and Japan, etc. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: American Institute of Certified Public Accountants

FILE SIZE: Approximately 12,000 citations per year

COVERAGE: 1974 to present

UPDATING: Quarterly, approximately 3,000 citations

COST: $65/computer-connect hour
$0.10/citation for off-line printing

ORBIT AGRICOLA

Covers worldwide journal and monographic literature, and U.S. government reports in agriculture and related subject fields, including general agriculture and rural sociology; agricultural economics; consumer protection and human nutrition; animal science; veterinary medicine; forestry and plant-related areas; agricultural chemistry; natural resources; entomology; and agricultural engineering. Consists of three sub-files: CAIN, FNC (Food and Nutrition Collection), and Agricultural Economics.

PREPARED BY: U.S. National Agricultural Library

FILE SIZE: Approximately 144,000 records per year

COVERAGE: January, 1970 to present

UPDATING: Monthly, approximately 12,000 citations

COST: $35/computer-connect hour
$0.06/citation for off-line printing

ORBIT APILIT

Covers worldwide refining literature, including petroleum refining, petro-chemicals, air and water conservation, transportation and storage, and petroleum substitutes. Source documents include trade magazines, technical journals, meeting papers, and government reports. Available only to subscribers of the Central Abstracting and Indexing Service of the American Petroleum Institute. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: American Petroleum Institute

FILE SIZE: Approximately 18,000 records per year

COVERAGE: January, 1964 to present

UPDATING: Monthly, approximately 1,500 citations

COST: $65/computer-connect hour
$0.11/citation for off-line printing

ORBIT APIPAT

Contains citations to refining patents from the U.S. and nine other countries: Belgium, Canada, France, Germany, Great Britain, Holland, Italy, Japan, and South Africa. Subject coverage includes the same areas covered by APILIT. Available only to subscribers of the Central Abstracting and Indexing Service of the American Petroleum Institute. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: American Petroleum Institute

FILE SIZE: Approximately 8,400 records per year

COVERAGE: January, 1964 to present

UPDATING: Monthly, approximately 600 citations

COST: $65/computer-connect hour
$0.11/citation for off-line printing

ORBIT ASI

American Statistics Index, covering statistical publications of the U.S. Government; periodicals, annuals, biennials, surveys, analytical reports, statistical compilations, continuing serials, and special publications. Subject coverage is as broad as the Government's national and international interest including the entire spectrum of social, economic, and demographic data (e.g., employment, governmental finances, industry-specific data, transportation, housing, and health). *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Congressional Information Service, Inc.

FILE SIZE: Approximately 9,600 records per year

COVERAGE: January, 1973 to present (and selected coverage of publications issued during the 1960's)

UPDATING: Monthly

COST: Subscribers: $100/computer-connect hour
$0.25/citation for off-line printing
Non-subscribers: $120/computer-connect hour
$0.25/citation for off-line printing

ORBIT BIOSIS PREVIEWS

Includes contents of Biological Abstracts (BA) and BioResearch Index (BioI) covering the entire life sciences. Literature selected must meet one of the following selection criteria: original research reports in biological and biomedical fields, reviews of original research in biology, history and philosophy of the biological and biomedical sciences, or documentation and retrieval of biological and biomedical information. Citations are taken from approximately 8000 serial publications as well as books, notes, research communications and symposia.

PREPARED BY: Biological Sciences Information Service

FILE SIZE: Approximately 200,000 records per year

COVERAGE: January, 1972 to present

UPDATING: BioI: Monthly, approximately 8,000 citations
BA: Bi-monthly, approximately 6,000 citations

COST: $65/computer-connect hour
$0.10/citation for off-line printing

ORBIT CAMBRIDGE SCIENTIFIC ABSTRACTS GROUP

Covering a broad range of the world's scientific-technical literature, the Cambridge Scientific Abstracts Group will be offered by SDC Search Service in two on-line files. One file will contain Electronics & Communications Abstracts, Computer & Information Systems Abstracts, Solid State Abstracts, and Science Research Abstracts (includes Superconductivity Research, MHD and Plasmas, Theoretical Physics, Laser and Electro-Optic Reviews: Quantum Electronics). The second file, Safety Science Abstracts, includes the science of safety covering events of phenomena which threaten mankind, his environment or technology. Citations for these data bases are gathered from book reviews, financial news, government affairs, new product news, and patents. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Cambridge Scientific Abstracts

COVERAGE: 1975 to present

COST: To be announced when file available.

ORBIT CDI

Comprehensive Dissertation Index, containing all dissertations accepted for academic doctoral degrees granted by U.S. educational institutions and over 125 non-U.S. universities. Contents correspond to two printed products: Dissertation Abstracts International (for which full-text copies are available from UMI) and American Doctoral Dissertations. Subject coverage is multi-disciplinary, and includes the humanities, social sciences, sciences, and engineering.

PREPARED BY: University Microfilms International

FILE SIZE: Approximately 46,000 records per year

COVERAGE: 1861 to present

UPDATING: Monthly, approximately 3,000 citations

COST: $55/computer-connect hour
$0.12/citation for off-line printing

ORBIT CHEMCON AND CHEM7071

Provides worldwide coverage of the chemical sciences literature from over 12,000 journals, patents from 26 countries, new books, conference proceedings, and government research reports. Coverage corresponds to the printed Chemical Abstracts Condensates, including 80 main subject sections such as biochemistry, organic chemistry, macromolecular chemistry, applied chemistry and chemical engineering, and physical and analytical chemistry.

PREPARED BY: Chemical Abstracts Service

FILE SIZE: CHEMCON: approximately 312 records per year
CHEM7071: approximately 600,000 records

COVERAGE: CHEMCON: January, 1972 to present
CHEM7071: January, 1970 - December, 1971

UPDATING: Bi-weekly, approximately 12,000 citations (CHEMCON only)

COST: $60/computer-connect hour
$0.12/citation for off-line printing

ORBIT CIN

Chemical Industry Notes, containing citations to the business literature in the chemical industry, including pharmaceutical, petroleum, paper and pulp, agriculture and food industries. Subject coverage ranges to include production, pricing, sales, facilities, products and processes, corporate activities, government activities, and people. Covers over 80 U.S. and non-U.S. publications.

PREPARED BY: Chemical Abstracts Service

FILE SIZE: Approximately 52,000 records per year

COVERAGE: December 1974 to present

UPDATING: Weekly, approximately 1,000 citations

COST: $70/computer-connect hour
$0.10/citation for off-line printing

ORBIT CIS INDEX

Covers U.S. Congress publications: hearings; committee prints; House and Senate Reports, Documents and special publications; Senate Executive Reports and Documents. Public Laws are added on an annual basis. Subject coverage is multi-disciplinary and topical including public service programs, raw materials and consumer products, and legal policies and events. Non-subscribers must purchase one Annual Index from CIS, Inc. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Congressional Information Service, Inc.

FILE SIZE: Approximately 12,000 records per year

COVERAGE: January, 1970 to present

UPDATING: Monthly, approximately 1,000 citations

COST: Non-subscribers: $120/computer-connect hour
$0.25/citation for off-line printing
Subscribers: $100/computer-connect hour
$0.25/citation for off-line printing

ORBIT COMPENDEX

Corresponds to Engineering Index Monthly. Covers civil-environmental-geological engineering; mining-metals-petroleum-fuel engineering; mechanical-automotive-nuclear-aerospace engineering; electrical-

electronics-control engineering; chemical agricultural-food engineering; and industrial engineering, management, mathematics, physics, and instruments, including approximately 1500 serials and over 900 monographic publications.

PREPARED BY: Engineering Index, Inc.

FILE SIZE: Approximately 84,000 records per year

COVERAGE: January, 1970 to present

UPDATING: Monthly, approximately 6,000 citations

COST: $65/computer-connect hour
$0.10/citation for off-line printing

ORBIT CRECORD

Provides comprehensive, highly current coverage of the Congressional Record, the official journal of proceedings of the U.S. Congress, including the House, Senate, Extension of Remarks, and Digest sections. Contains references to bills and resolutions, committee and subcommittee reports, legislation schedules of committee and floor activities, executive communications, and speeches, participation in debates, and inserted materials by members of Congress. References are indexed and cross-referenced in 275 legislative areas. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Capitol Services, Inc.

FILE SIZE: Approximately 40,000 records per year

COVERAGE: 1976 to present (beginning with the second session of the 94th Congress)

UPDATING: Weekly, approximately 1,750 citations

COST: $80/computer-connect hour
$0.15/citation for off-line printing

ORBIT ENERGYLINE

Comprehensive coverage of over 200 core journals and selected coverage of 2,000 other journals, as well as reports and surveys, monographs, conference proceedings, irregular serials, and newspaper articles. Subject-area coverage includes energy economics; U.S. policy and planning; international political and economic issues; research and development; resources and reserves; environmental impact; electric power transmission and storage; fuel production; fuel transport; nuclear power; and industrial, transportation, and residential consumption. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Environment Information Center, Inc.

FILE SIZE: Approximately 4,800 records per year

COVERAGE: January, 1971 to present

UPDATING: Bi-monthly, approximately 800 citations

COST: Non-subscribers: $95/computer-connect hour
$0.25/citation for off-line printing
Subscribers: $85/computer-connect hour
$0.20/citation for off-line printing

ORBIT ERIC

Corresponds to the monthly CIJE (Current Index to Journals in Education) and RIE (Resources In Education). Covers report and periodical literature in many education and education-related areas; counseling and personnel services; career education; early childhood education; educational management; exceptional children; information resources; languages and linguistics; reading and communications; rural education; environmental education; teacher education; and tests, measurement, and evaluation.

PREPARED BY: Under funding by the U.S. National Institute of Education

FILE SIZE: Approximately 30,000 records per year

COVERAGE: January, 1966 to present

UPDATING: Monthly, approximately 2,500 citations

COST: $35/computer-connect hour
$0.08/citation for off-line printing

ORBIT FSTA

Corresponds to the printed Food Science and Technology Abstracts, produced by the International Food Information Service. Covers the literature related to all human food commodities and aspects of food processing, except the production of raw foods. Subject areas covered include basic food science; microbiology, hygiene and toxicology; food economics and statistics; food engineering; food packaging; commodity techniques alcoholic and non-alcoholic beverages; fruits, vegetables and nuts; fish and marine products; food additives, spices and condiments; and food laws, regulations and standards; and more. Source documents gathered worldwide include patents, books, standards, and journal articles.

PREPARED BY: International Food Information Service

FILE SIZE: Approximately 17,000 records per year

COVERAGE: 1969 to present

UPDATING: Monthly, approximately 1500 records

COST: To be announced when file available

ORBIT GeoRef

Geological Reference file, covering geosciences literature from 3000 journals, plus conferences and major symposia and monographs, in such areas as geology, economic geology, engineering-environment geology, geo-chemistry, geochronology, geomorphology, igneous and metamorphic petrology, solid earth geophysics, and stratigraphy; a total of some 29 different geoscience areas. Includes citations from Bibliography and Index of Geology and more. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: The American Geological Institute

FILE SIZE: Approximately 36,000 records per year

COVERAGE: January, 1967

UPDATING: Monthly, approximately 4,000 citations

COST: $75/computer-connect hour
$0.20/citation for off-line printing

ORBIT GRANTS

Complete, single source reference to more than 1500 grant programs offered by federal, state, and local governments, commercial organizations, associations and private foundations in over 88 disciplines, including adult education, agriculture, social sciences, fine arts, architecture, natural sciences, and law. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Oryx Press

FILE SIZE: 1500 records per update

COVERAGE: Currently available grants

UPDATING: Monthly, full file replaced with current programs

COST: $60/computer-connect hour
$0.35/citation for off-line printing

ORBIT INFORM

Covers business management periodical literature from over 300 journals, in the areas of accounting, administration, advertising, banking, data processing, economics, employee benefits, finance, insurance, international trade, labor relations, operations research, real estate, social conditions, statistics, business law, stocks and bonds, taxes, and training and education, to name a few.

PREPARED BY: ABI, a division of Data Courier, Inc.

FILE SIZE: Approximately 14,400 records per year

COVERAGE: August, 1971 to present

UPDATING: Monthly, approximately 1,200 citations

COST: $65/computer connect hour
$0.10/citation for off-line printing

ORBIT INSPEC

Provides worldwide coverage of the literature in physics, electrical and electronics engineering. Source documents are primarily journal articles; however, government reports, patents, and monographs are included. Corresponds in coverage to Physics Abstracts, Electrical & Electronics Abstracts, and Computer & Control Abstracts.

PREPARED BY: Institution of Electrical Engineers

FILE SIZE: Approximately 150,000 records per year

COVERAGE: 1970 to the present

UPDATING: Monthly

COST: To be announced when file available.

ORBIT LIBCON/E

Provides extensive coverage of the monographic literature and some non-print materials cataloged by the U.S. Library of Congress (LC). Includes MARC records distributed by LC and MET (main/entry/title) records keyed by 3-M from the LC depository card set. Covers English-language materials in all subject areas. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: 3-M

FILE SIZE: Approximately 102,000 records per year

COVERAGE: 1968 entry year coverage for MARC;
1969 for MET records
Publication year includes pre-20th Century materials

UPDATING: Weekly, approximately 2,100 citations

COST: $120/computer-connect hour
$0.25/citation for off-line printing

ORBIT LIBCON/F

Provides coverage of the monographic literature and some non-print materials cataloged by the U.S. Library of Congress (LC). Includes MARC records distributed by LC and MET (main/entry/title) records keyed by 3-M from the LC depository card set. Includes MARC records of the French, German, Portuguese, and Spanish literature, and MET records of all Roman-alphabet languages (and transliterated items). *Available on-line exclusively on the ORBIT system.*

PREPARED BY: 3-M

FILE SIZE: Approximately 72,000 records per year

COVERAGE: 1968 entry year coverage for MARC;
1969 for MET records
Publication year includes pre-20th Century materials

UPDATING: Monthly, approximately 6,000 citations

COST: $120/computer-connect hour
$0.25/citation for off-line printing

ORBIT LISA

Based on the printed Library & Information Science Abstracts, provides worldwide coverage of the field of library and information science, including technical processes and services; promotion of use of libraries and library materials; organization and administration; library stock and materials; use of libraries and library materials; institutional libraries (e.g., hospital libraries, children's libraries); librarianship; publishing; bookselling; reading; and reprography. Primary materials are gathered in over 20 languages from 300 periodicals, papers in conference proceedings, books and reports.

PREPARED BY: Library Association, England

FILE SIZE: Approximately 4,000 records per year

COVERAGE: 1969 to present

UPDATING: Bi-monthly, approximately 700 records

COST: $50/computer-connect hour
$0.10/citation for off-line printing

ORBIT MANAGEMENT

Provides extensive coverage of the business literature gathered from both U.S. and non-U.S. journals,

proceedings, and transactions. Content coverage includes accounting, banking, commodities and goods, economics, finance, government regulations, human resource development, industrial relations, management, marketing, production, professions, public administration and government, social issues, systems and controls, and industry-specific literature. Corresponds to the semi-monthly Management Contents.

PREPARED BY: Management Information Services

FILE SIZE: Approximately 12,000 records per year

COVERAGE: September, 1974 to present

UPDATING: Monthly, approximately 1,000 citation

COST: $65/computer-connect hour
$0.10/citation for off-line printing

ORBIT NTIS

Broad and cross-disciplinary file containing citations to U.S. government-sponsored research and development technical reports from over 200 Federal agencies and some reprints, federally-sponsored translations, and foreign-language reports in areas of major technical interest. Multi-disciplinary scope includes aeronautics; agriculture; astronomy and astrophysics; behavioral/social sciences; biological and medical sciences; chemistry; earth sciences; oceanography; electronics; engineering; energy; materials; mathematical sciences; military sciences; communications; space technology. Corresponds to Weekly Government Abstracts and semi-monthly Government Reports Announcements.

PREPARED BY: National Technical Information Service (NTIS) of the U.S. Department of Commerce

FILE SIZE: Approximately 60,000 records per year

COVERAGE: January, 1970 to present

UPDATING: Bi-weekly, approximately 2,300 citations

COST: $45/computer-connect hour
$0.08/citation for off-line printing

ORBIT PAPERCHEM

Covers the scientific and technical literature, including patents, of the pulp-, paper-, and board-manufacturing and utilizing industries gathered from all industrialized countries. Source documents include nearly 1,000 periodicals published in over 20 languages, patent gazettes of six major countries, symposium proceedings, and selected secondary sources. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Institute of Paper Chemistry

FILE SIZE: Approximately 12,000 records per year

COVERAGE: January, 1968 to present

UPDATING: Monthly, approximately 1,000 citations

COST: Subscribers and academic institutions:
$80/computer-connect hour
$0.10/citation for off-line printing
Non-subscribers: $110/computer-connect hour
$0.15/citations for off-line printing

ORBIT PATENTS

Comprehensive and authoritative World Patent Index file contains documents relating to patent specifications issued by the Patent Offices of the major industrial nations. The countries covered since 1963 include Belgium, France, Japan, the Netherlands, South Africa, West Germany, Canada, East Germany, the Soviet Union, Switzerland, the United Kingdom, & U.S. Portugal, Sweden, Austria, Brazil, Czechoslovakia, Hungary, Israel, and Rumania were introduced during 1975. Corresponds in coverage to Central Patents Index and the World Patent Index. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Derwent Publications, Ltd.

FILE SIZE: Approximately 234,000 new inventions and 264,000 "equivalent" filings per year

COVERAGE: Variable by subject matter: pharmaceuticals, 1963: agricultural chemicals, 1965; plastics, 1966; all chemistry, 1970; mechanical, electrical, and general, 1974 to present

UPDATING: Monthly, approximately 19,500 new inventions and 22,000 "equivalent" filings

COST: Non-subscribers: $120/computer-connect hour
$0.15/citation for off-line printing
Subscribers: rate available from Derwent Publications, Ltd.

ORBIT P/E NEWS

Covers five major publications in the petroleum and energy fields: Platts Oilgram News Service; Middle East Economic Survey; Petroleum Intelligence Weekly; Petroleum Economist; and Oil Daily. Extensive indexing by company and individual names, as well as location, and subject. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Central Abstracting Indexing Service of the American Petroleum Institute

FILE SIZE: Approximately 26,000 records per year

COVERAGE: January, 1975

UPDATING: Weekly, approximately 500 citations

COST: Non-subscribers: $115/computer-connect hour
$0.11/citation for off-line printing
Subscribers: $95/computer-connect hour
$0.11/citation for off-line printing

ORBIT PNI

Pharmaceutical News Index, covering items from four weekly pharmaceutical newsletters: Drug Research Reports ("The Blue Sheet"); FDC Reports ("The Pink Sheet"); the PMA Newsletter; and the Washington Drug and Device Letter. Coverage includes major health bills; individual company's sales and earnings analyses; FDA recalls and court actions; NDA approvals; legislative actions; Federal Register notices and hearings; FDC Index of over-the-counter drug, cosmetic stocks; legislative actions; text of industry speeches; and synopses of research grant applications; etc.

PREPARED BY: Data Courier, Inc.

FILE SIZE: Approximately 7,200 records per year

COVERAGE: FDC Reports from January, 1974; Others from January 1976 to present

UPDATING: Monthly, approximately 700 citations

COST: $65/computer-connect hour
$0.15/citation for off-line printing

ORBIT POLLUTION

Corresponds in coverage to the printed POLLUTION ABSTRACTS publication. Covers U.S. and domestic reports; some 2,500 journals; selected conference proceedings and papers; symposia; contracts and patents; monographs and government documents in the areas of pollution control and research including air pollution, water pollution, solid wastes, noise, pesticides, radiation, and general environmental quality.

PREPARED BY: Pollution Abstracts, a division of Data Courier, Inc.

FILE SIZE: Approximately 6,000 records per year

COVERAGE: January, 1970 to present

UPDATING: Bi-monthly, approximately 1,000 citations

COST: $65/computer-connect hour
$0.15/citation for off-line printing

ORBIT PSYCH ABSTRACTS

Worldwide coverage of psychology and other behavioral sciences primarily from the journal literature. Includes major subject areas such as, Psychometrics and Statistics, Perception and Motor Performance, Cognitive Processes and Motivation, Neurology and Physiology, Psychopharmacology and Physiological Intervention, Animal Psychology, Developmental Psychology, Cultural Influences and Social Issues, Communication and Language, Personality, Physical and Psychological Disorders, Treatment and Prevention, Education Psychology and Applied Psychology. Corresponds in coverage with the printed Psychological Abstracts.

PREPARED BY: American Psychological Association, Inc.

FILE SIZE: Approximately 25,000 records per year

COVERAGE: 1967 to present

COST: To be announced when file available.

ORBIT RINGDOC

Covers over 400 of the world's scientific journals to provide extensive coverage of the pharmaceutical literature. Access points to the citations include keywords and multipunch coded data (representing chemical fragments). Access granted to subscribers only. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Derwent Publications, Ltd.

FILE SIZE: Approximately 50,000 citations per year

COVERAGE: July, 1964 to present

UPDATING: Monthly, approximately 4,000 citations

COST: Available from Derwent Publications, Ltd.
London, England

ORBIT SAE ABSTRACTS

Worldwide coverage of papers concerned with self-propelled vehicles gathered from industry, government and academic sectors as well as research and private organizations. Subject coverage includes aircraft, missiles and spacecraft, ground support equipment, passenger cars, military equipment, aircraft propulsion, electric vehicles, energy conversion, fuels and lubricants, manufacturing and production, transportation systems, emissions, safety, noise, management, testing and instrumentation. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Society of Automotive Engineers, Inc.

FILE SIZE: Approximately 800 records per year

COVERAGE: January, 1965 to present

UPDATING: Quarterly, approximately 200 records

COST: $80/computer-connect hour
$0.15/citation for off-line printing

ORBIT SSIE

Covers on-going and recently completed research in the agricultural sciences, behavioral sciences, biological sciences, earth sciences, chemistry and chemical engineering, electronics, engineering, materials, mathematics, medical sciences, physics, and social sciences--both basic and applied research projects. Research in progress is included from over 1,300 funding organizations, such as Federal, state, and local government; non-profit associations; colleges and universities; nonaffiliated investigators; and some non-U.S. organizations and private industry. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: Smithsonian Science Information Exchange, Inc.

FILE SIZE: Approximately 108,000 projects per fiscal year

COVERAGE: Fiscal Year 1974 to date

UPDATING: Monthly, approximately 9,000 records

COST: $110/computer-connect hour
$0.15/citation for off-line printing

ORBIT TITUS

A comprehensive file of information related to the textile industry, designed to be useful to textile managers, engineers, and technicians. Citations for TITUS are gathered from more than 800 periodicals (scientific journals and technical magazines), technical reports, patents, standards, scientific theses, manufacturers; technical data-sheets, conference reports, and legal and administrative regulations. Subject coverage includes fibres, bonding, analysis, agents, polymerization, properties, testing, treatments, weave, and chemical composition. *Available on-line exclusively on the ORBIT system except in Europe.*

PREPARED BY: Institut Textile de France

FILE SIZE: Approximately 18,000 records per year

UPDATING: Monthly, approximately 1,500 records

COST: $75/computer-connect hour
$0.15/citation for off-line printing

ORBIT TULSA

Covers worldwide literature and patents related to oil and natural gas exploration, development, and production in such areas as petroleum geology, exploration geophysics and geochemistry; well drilling; well logging, well completion and servicing; oil and gas production; reservoir studies and recovery methods; pollution; alternative fuels and energy sources; and petroleum transportation and storage. Corresponds in coverage to Petroleum Abstracts. *Available on-line exclusively on the ORBIT system.*

PREPARED BY: University of Tulsa, Information Services Department

FILE SIZE: Approximately 18,000 records per year

COVERAGE: 1965 to present

UPDATING: Monthly, approximately 1,500 citations

COST: Subscriber: $100/computer-connect hour
$0.15/citation for off-line printing
Partial Subscriber: $100/computer-connect hr.
$0.50/citation for off-line printing
Non-subscriber: $125/computer-connect hour
$0.50/citation for off-line printing

NOTES

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Effective January 1, 1977, a discount will be given automatically to subscribing organizations that use more than 4.99 connect hours per month. This volume discount increases incrementally with each hour of use and will be computed against total billable connect hours on the monthly invoice. Copies of the discount schedule are available separately from SDC.